A Recombinant Multi-Stage Vaccine against Paratuberculosis Significantly Reduces Bacterial Level in Tissues without Interference in Diagnostics

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A recombinant multi-stage vaccine against paratuberculosis significantly reduces bacterial level in tissues without interference in diagnostics

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A new (FET11) recombinant vaccine against paratuberculosis was developed based on recombinant antigens from acute and latent stages of *Mycobacterium avium* subsp. *paratuberculosis* (Map) infection.

In two experiments 28 calves and 15 goats were orally inoculated with live Map in their third week of life and post-exposure vaccinated at different times after inoculation or with different vaccine constructs. In contrast to common whole-cells vaccination, the FET11 vaccine did not interfere with tests for paratuberculosis or bovine tuberculosis as no measurable antibody responses by ID Screen® ELISA, PPDj-specific IFN-γ responses or positive PPDa or PPDb skin tests developed in vaccinees. Antibodies and cell-mediated immune responses were developed against FET11 antigens, however. At necropsy 8 or 12 months of age, relative Map burden was determined in a number of gut tissues by quantitative IS900 PCR and revealed significantly reduced levels of Map and reduced histopathology. Diagnostic tests for antibody responses and cell-mediated immune responses, used as surrogates of infection, corroborated the observed vaccine efficacy: Five of seven non-vaccinated calves seroconverted in ID Screen® ELISA at 32 to 40 weeks p.i. indicating the progression of infection, while only four of 14 FET11 vaccinated calves seroconverted at 40-52 weeks p.i. Similarly, PPDj-induced IFN-γ responses increased over time in non-vaccinated calves, while FET11 vaccinated calves had significantly reduced PPDj IFN-γ assay responses from 40 to 52 weeks compared to non-vaccinated calves. These results indicate the FET11 vaccine can be used to accelerate eradication of paratuberculosis while surveillance or test-and-manage control programs for tuberculosis and Johne's disease remain in place.

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